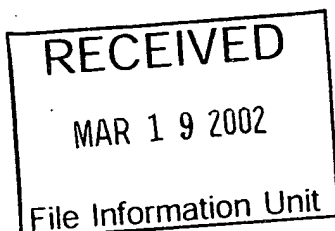


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## REQUEST FOR ACCESS TO AN APPLICATION UNDER 37 CFR 1.14(e)



In re Application of

Bergman et al

Application Number

09-061318

Filed

4-16-98

Art Unit

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# United States Patent

Bergman et al.

(10) Patent No.: **US 6,273,108 B1**  
 (45) Date of Patent: **Aug. 14, 2001**

## (54) APPARATUS AND METHOD FOR PROCESSING THE SURFACE OF A WORKPIECE WITH OZONE

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 (73) Assignee: Semitool, Inc., Kalispell, MT (US)  
 (\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/677,929

(22) Filed: Oct. 3, 2000

### Related U.S. Application Data

- (60) Division of application No. 09/061,318, filed on Apr. 16, 1998, which is a continuation-in-part of application No. 08/853,649, filed on May 9, 1997.

(51) Int. Cl.<sup>7</sup> ..... B08B 3/02

(52) U.S. Cl. .... 134/102.1; 134/95.3; 134/105; 134/902; 134/111; 134/103.1

(58) Field of Search ..... 134/94.1, 95.1, 134/95.2, 95.3, 99.2, 102.1, 103.1, 105, 107, 108, 111, 102

### (56) References Cited

#### U.S. PATENT DOCUMENTS

- 4,695,327 9/1987 Grebinski .  
 4,778,532 \* 10/1988 McConnell et al. .  
 4,899,767 \* 2/1990 McConnell et al. .

(List continued on next page.)

#### FOREIGN PATENT DOCUMENTS

- 0 344 764 12/1989 (EP) .  
 0 548 596 A2 6/1993 (EP) .  
 0 702 399 3/1996 (EP) .  
 2 287 827 9/1995 (GB) .  
 52-12063 4/1977 (JP) .

### OTHER PUBLICATIONS

Translation/Abstract of Japanese Appln. No. 1984-125760 published Jan. 10, 1986.

Heyns, M.M., et al. "New Wet Cleaning Strategies for Obtaining Highly Reliable Thin Oxides," MRP Symposium Proceedings on Materials Research Society, Spring Meeting, San Francisco, CA Apr. 12-13, 1993, p. 35 (1993).

Adler, Marilyn Grace and Hall, George Richard, "The Kinetics and Mechanism of Hydroxide Ion Catalyzed Ozone Decomposition in Aqueous Solution" *J. Am. Chem. Soc.*, vol. 72, pp. 1884-1886, 1950.

Nelson, Steve, "Ozonated water for photoresist removal" *Solid State Technology*, pp. 107-112 (Jul. 1999).

Christenson, Kurt K., et al. "Deionized Water Helps Remove Wafer Stripping 'Resist'-ance," *www.precisioncleaningweb.com—Precision Cleaning Web—Archives*, pp. 10-20 (Apr. 1998).

Sehested, K., et al., "Decomposition of Ozone in Aqueous Acid Solutions (pH 0-4)," *J. Phys. Chem.*, pp. 1005-1009 (1992).

(List continued on next page.)

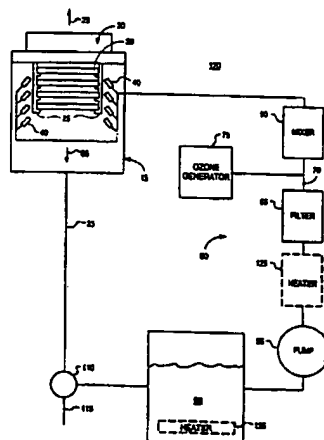
Primary Examiner—Frankie L. Stinson

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### (57) ABSTRACT

An apparatus for supplying a mixture of a treatment liquid and ozone for treatment of a surface of a workpiece, and a corresponding method are set forth. The preferred embodiment of the apparatus comprises a liquid supply line that is used to provide fluid communication between a reservoir containing the treatment liquid and a treatment chamber housing the workpiece. A heater is disposed to heat the workpiece, either directly or indirectly. Preferably, the workpiece is heated by heating the treatment liquid that is supplied to the workpiece. One or more nozzles accept the treatment liquid from the liquid supply line and spray it onto the surface of the workpiece while an ozone generator provides ozone into an environment containing the workpiece.

21 Claims, 6 Drawing Sheets



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